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Isolation and characterization of a molybdenum-reducing and phenoli

Abstract

Molybdenum is an emerging pollutant worldwide. The objective of this study is to isolate molybdenum-reducing bacterium with the ability to grow on phenolic compounds (phenol and catechol). The screening process was carried out on a microplate. The bacterium reduced molybdenum in the form of sodium molybdate to molybdenum blue (Mo-blue). The bacterium required a narrow pH range for optimal reduction of molybdenum, i.e. between pH 6.3 and 6.8, with temperature between 34 and 37 oC. Molybdate reduction to Mo-blue was best supported by glucose as the carbon source. However, both phenol and catechol could not support molybdate reduction. Other requirements for molybdate reduction included sodium molybdate concentrations between 15 and 30 mM, and phosphate concentration of 5.0 mM. The bacterium exhibited a Mo-blue absorption spectrum with a shoulder at 700 nm and a maximum peak near the infrared region at 865 nm. The Mo-reducing bacterium was partially identified as Enterobacter sp. strain Saw-2. The capability of this bacterium to grow on toxic phenolic compounds and to detoxify molybdenum made it a significant agent for bioremediation.